

Office Action Summary

Application No.

10/749,693

Applicant(s)

SUTSKOVER ET AL.

Examiner

ADOLF DSOUZA

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-43 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☒ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

Response to Arguments

1. Applicant's amendment to the claims in response to the 112 rejection has been accepted by the Examiner.
2. Applicant did amend claim 41, as suggested by the Examiner. As stated in claim 41, it is not clear as to whether the interference mitigation is done on the transmitter or receiver side. In view of this, Examiner is rejecting claim 41 under 112/2nd paragraph.
3. Applicant's arguments filed 2/27/2008 have been fully considered but they are not persuasive.
 - a) Argument: With respect to claim 1, Applicant argued that the combination of Hwang and Foschini does not teach or suggest all these elements and that "Hwang makes clear that common channel data is not at all used to generate the dedicated channel signal" (Remarks 2/27/2008; page 12, line 1 – end of 2nd full paragraph)

Response: Examiner respectfully disagrees. Firstly, Applicant has stated in the specification (page 4, lines 15 – 17) that one type of common channel may be the pilot channel, another type of common channel may be the paging channel, etc. If the common channel is interpreted as the pilot channel, then a pilot or preamble to acquire the channel would be transmitted on it. Hwang discloses that a midamble sequence (Fig. 16, element 1624) is added to the dedicated channel. Though this is not explicitly shown added to the common channels (Fig. 16, elements 1626), it would be obvious to one of ordinary skill in the art that if the common channel were a pilot channel, then the midamble would also be transmitted on the common channel.

Therefore, in such a scenario, the midamble sequence 1624 (which would correspond to the "first data" in claim 1), would be transmitted on both the common and dedicated channels.

- b) Argument: With respect to claim 1, Applicant argued that Foschini does not disclose "generating a transmit signal ..." (Remarks 2/27/2008; page 12, 2nd last paragraph)

Response: Examiner is using Hwang to disclose the above, not Foschini, so Applicant's arguments are not relevant. Examiner is using Foschini to obtain the channel estimate values, which are then transmitted back to the transmitter to be used there.

- c) Argument: With respect to claim 15, Applicant argued: "But paragraphs 0081 and 0091 of Fitton are related to a receiver, and thus disclose nothing about generating transmit signals or generating a common channel interference component that is used to generate a transmit signal"

Response: Examiner is using Fitton to disclose the common channel interference component. Though it may be in the receiver, Foschini clearly states that the channel estimates obtained at the receiver can be sent to the transmitter and used to do the pre-equalization there. When combined, one of ordinary skill in the art can easily modify Fitton using Foschini's method.

4. Applicant's arguments with respect to claim 41 (page 16, last paragraph) have been considered but are moot in view of the new ground(s) of rejection. Applicant amended the claim to include "using common channel information" and then argued that the references did not disclose that. Examiner is now introducing Hwang and Foschini to reject this claim.
5. Applicant's arguments, see Remarks (page 15), filed 2/27/2008 with respect to the rejection(s) of claim(s) 35 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of (see below).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 27 – 34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 27, the last limitation states "generating transmit signals to be transmitted to user devices associated with said second class using said first data, said

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second data, and said channel information ". The specification doesn't adequately disclose how, the first data and second data are combined and transmitted to user devices associated with said second class. Further, it is confusing as to whether the first data is actually sent to the second class user devices. Fig. 7, block 82 states that the first data is sent to the old class (first class) user devices and block 84 states that the second data is sent to the new class (second class) devices. Then block 88 states that the first data is sent to the second class devices. If the first data is sent to both first and second class device, then block 84 description should be changed to state this. The specification (page 13, lines 10 – 15) and doesn't provide any more details than Fig. 7. Examiner is rejecting claim 27, assuming that the first data and second data are both transmitted to the second class user devices.

Claims 28 – 34 are rejected based on their dependency on a rejected base claim.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 4 1- 43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Regarding claim 41, it is not clear as to whether the interference mitigation is done on the transmitter or receiver side. See Response to Arguments above and also Response to Arguments (section 3) in CTNF (11/27/2007).

Claims 42 – 43 are rejected based on their dependency on a rejected base claim.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 1-3, 6, 7, 10, 11, 14, 22-24, 41, 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) in view of Foschini et al. (US 20030104808).

Claims 1, 22, Hwang discloses:

- obtaining first data to be delivered to multiple user devices via a common channel ([0150], lines 1-4, 43-48);
- obtaining second data to be delivered to a specific user device via a dedicated channel ([0150], lines 1-4, 43-48);

- acquiring channel information for a common channel between a transmitter and said specific user device ([0153], lines 16-22);
- and generating a transmit signal for said specific user device using said first data, said second data, said transmit signal to be transmitted from said transmitter to said specific user device via a dedicated channel ([0149], lines 1-6, [0150], lines 43-48, 54-55. Also see Response to Arguments (a) above).

Hwang does not disclose that the transmit signal is generated using the channel information. In the same field of endeavor, however, Foschini discloses the transmit signal is generated using the channel information ([0027]). Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Foschini, in the system of Hwang because this would enable the interference to be precompensated for, thereby increasing system capacity, as disclosed by Foschini ([0003]).

Claims 2, 23, Hwang further discloses acquiring channel information for a dedicated channel between said transmitter and said specific user device before generating said transmit signal, wherein generating said transmit signal includes using said channel information for said dedicated channel ([0149], [0150]).

Claims 3, 24, Hwang further discloses said transmit signal is configured so that common channel interference will be at least partially cancelled within said specific user device after reception therein ([0153]).

Claim 6, Hwang further discloses acquiring channel information includes receiving channel information from said specific user device ([0153], lines 16-22).

Claim 7, Hwang further discloses said transmitter is part of a base station in a cellular CDMA system (abstract, line 3); and said first data includes data to be broadcast as part of a pilot signal ([0010]).

Claim 10, Hwang further discloses generating a transmit signal includes determining a common channel interference component that would be output by a receiver of said specific user device as a result of transmitting said first data from said transmitter into said common channel without using interference mitigation ([0153], lines 16-22).

Claim 11, Hwang further discloses determining a common channel interference component includes determining an effect of the common channel, as given by said channel information, on said first data ([0153], lines 16-22).

Claim 14, Hwang further discloses transmitting said transmit signal from said transmitter ([0068]).

Claim 41 limitations are analyzed similar to those in claim 1, with the common channel information being the midamble sequence that is transmitted on both the common and dedicated channels. The mitigation of channel interference is done as disclosed by Foschini.

Claim 43, is analyzed similar to limitations in claim 1, where the channel information is obtained and used on the transmitter side, as disclosed by Foschini.

12. Claim 27 - 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) in view of Foschini et al. (US 20030104808) and furthering view of Rasanen et al. (US 5,956,332).

Claim 27, Hwang discloses:

- obtaining first data to be delivered to user devices associated with a first class via corresponding dedicated channels ([0150], lines 1-4; Fig. 16, user data 1601; wherein the first data is interpreted as the input data to one of the dedicated channels);
- obtaining second data to be delivered to user devices associated with a second class via corresponding dedicated channels([0150], lines 1-4; Fig. 16, user data 1601; wherein the second data is interpreted as the input data to another one of the dedicated channels);
- acquiring channel information from user devices associated with said second class ([0153], lines 16-22);

generating transmit signals to be transmitted to user devices associated with said first class without using dirty paper techniques (Fig. 16; where no pre equalization is used on the dedicated channel that transmits the first data);

- generating transmit signals to be transmitted to user devices associated with said second class using said second data ([0149], lines 1-6, [0150], lines 43-48, 54-55).

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Hwang does not disclose combining the first and second data and using dirty paper techniques.

Hwang does not disclose that the transmit signal for the second class is generated using dirty paper techniques.

In the same field of endeavor, however, Foschini discloses the transmit signal is generated using dirty paper cancellation techniques ([0027], [0006]).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Foschini, in the system of Hwang for the channel associated with the second class because this would enable the interference to be precompensated for, thereby increasing system capacity, as disclosed by Foschini ([0003]).

Rasanen discloses combining first data and second data (Fig. 7B, element 68).

Rasanen discloses this on the receiver side but one having ordinary skill in the art, can easily use the data combiner on the transmitter side, to send both the first data and second data to the user devices associated with the second class, rather than only the second data to the user devices associated with the second class.

Claim 28, Hwang does not disclose that the user equipment in his invention includes user devices that do not use dirty paper cancellation techniques.

Claims 29, 30, Hwang fails to disclose using dirty paper cancellation techniques, however, Foschini discloses generating a transmit signal includes using dirty paper

cancellation techniques ([0006]). Foschini further discloses the use of these techniques reduces the computational burden of interference cancellation ([0006]). Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the dirty paper cancellation as disclosed by Foschini into the invention of Hwang.

Claims 31, 32, Hwang fails to disclose generating transmit signals includes generating signals that are configured to cancel interference caused by signals transmitted to user devices, however, Foschini discloses generating transmit signals includes generating signals that are configured to cancel interference caused by signals transmitted to user devices ([0006]). Because interference cancellation in the transmit signal generation will improve signal efficiency and accuracy, it would have been obvious to one skilled in the art at the time of invention to incorporate the interference cancellation as disclosed by Foschini into the invention of Hwang. 11.

13. Claims 15 – 17, 19, 20, and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fitton (U.S. Pub. No. 2004/0028121) in view of Foschini et al. (US 20030104808).

Claims 15, 19, Fitton discloses:

- at least one dipole antenna ([0038], line 5)

- a common channel interference unit to determine a common channel interference component associated with a remote user device ([0081], lines 3-6)
- generating a transmit signal to be transmitted to said remote user device via a dedicated channel, said transmit signal generator using said dedicated data to generate said transmit signal ([0013], lines 4-5, [0091], lines 1-3).
- a transmit signal transmitted using said at least one dipole antenna ([0038], line 5).

Fitton does not disclose that the transmit signal is generated using the channel information. In the same field of endeavor, however, Foschini discloses the transmit signal is generated using the common channel interference component ([0027]).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Foschini, in the system of Fitton because this would enable the interference to be precompensated for, thereby increasing system capacity, as disclosed by Foschini ([0003]).

Claims 16,.20, said common channel interference unit determines said common channel interference component using known common channel transmit data and corresponding channel information (Fitton [0087], line 2).

Claim 35, Fitton discloses:

- an interference unit to collect data to be delivered to user devices within a first class via corresponding dedicated channels and to use the collected data to generate a composite interference signal ([0081], lines 3-6);

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• a transmit signal generator to generate transmit signals to be transmitted to user devices associated with said first class without using dirty paper techniques.

Fitton does not disclose using dirty paper techniques.

However, Foschini discloses within a second class via corresponding dedicated channels, said transmit signal generator using said composite interference signal, dedicated data to be delivered to said user devices within said second class, and channel information associated with said user devices within said second class ([0013], lines 4-5, [0091], lines 1-3, [0087], line 2).

Therefore, it would be obvious to one of ordinary skill in the art to use the dirty paper technique disclosed by Foschini in the system of Fitton, so that the combined system could transmit to a first and a second class of devices.

Claim 36, Fitton does not disclose that the user equipment in his invention includes user devices that do not use dirty paper cancellation techniques.

Claims 17, 37, 38 Fitton fails to disclose using dirty paper cancellation techniques.

However, Foschini discloses generating a transmit signal includes using dirty paper cancellation techniques ([0006]). Foschini further discloses the use of these techniques reduces the computational burden of interference cancellation ([0006]). Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the dirty paper cancellation as disclosed by Foschini into the invention of Fitton.

14. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) in view of Nishio et al. (U.S. Pub. No. 2006/0166690).

Claim 8, Hwang discloses said transmitter is part of a base station in a cellular CDMA system (abstract, lines 1-3). Hwang fails to disclose data to be broadcast as part of a paging signal, however, Nishio discloses data to be broadcast as part of a paging signal ([0005], lines 6-7). Because Nishio discloses this signaling method has an advantage of more efficient power control ([0008]), it would have been obvious to one skilled in the art at the time of invention to incorporate the paging as disclosed by Nishio into the invention of Hwang.

15. Claims 9, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) as applied to claims 1 and 22 above, and further in view of Foschini et al. (U.S. Pub. No. 2003/0104808).

Claims 9, 25 Hwang fails to disclose using dirty paper cancellation techniques, however, Foschini discloses generating a transmit signal includes using dirty paper cancellation techniques ([0006]). Foschino further discloses the use of these techniques reduces the computational burden of interference cancellation ([0006]). Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the dirty paper cancellation as disclosed by Foschini into .the invention of Hwang.

16. Claims 13, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) in view of Shany et al. (U.S. Pub. No. 2004/0030979) and furthering view of Foschini et al. (U.S. Pub. No. 2003/0104808).

Claims 13, 26 Hwang fails to disclose generating a transmit signal includes performing a modulo lattice operation, however, Shany discloses generating a transmit signal includes performing a modulo lattice operation ([0001]). Because modulo lattice operations have computation advantages in the performing of interference canceling, it would have been obvious to one skilled in the art at the time of invention to incorporate the modulo lattice as disclosed by Shany into the invention as disclosed by Hwang.

17. Claims 18, 21, 39 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fitton (U.S. Pub. No. 2004/0028121) in view of Shany et al. (U.S. Pub. No. 2004/0030979) and further in view of Foschini et al. (U.S. Pub. No. 2003/0104808).

Claims 18, 21, 39, 42, Fitton fails to disclose generating a transmit signal includes performing a modulo lattice operation, however, Shany discloses generating a transmit signal includes performing a modulo lattice operation ([0001]). Because modulo lattice operations have computation advantages in the performing of interference canceling, it would have been obvious to one skilled in the art at the time of invention to incorporate the modulo lattice as disclosed by Shany into the invention as disclosed by Fitton.

18. Claims 4, 5, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) as applied to claims 1 and 27 above, and further in view of Fitton (U.S. Pub. No. 2004/0028121)

Claims 4, Hwang discloses use within a code division multiple access (CDMA) based system. Hwang fails to disclose said common channel interference will be at least partially cancelled at the chip level, however, Fitton discloses said common channel interference will be at least partially cancelled at the chip level ([0013], lines 4-5, [0091], lines 1-3, [0087], line 2). Because interference cancellation in the transmit signal generation will improve signal efficiency and accuracy, it would have been obvious to one skilled in the art at the time of invention to incorporate the interference cancellation as disclosed by Fitton into the invention of Hwang.

Claim 5, Hwang discloses use within a code division multiple access (CDMA) based system. Hwang fails to disclose said common channel interference will be at least partially cancelled at the symbol level, however, Fitton discloses common channel interference will be at least partially cancelled at the symbol level ([0013], lines 4-5, [0091]i lines 1-3, [0087], line 2). Because interference cancellation in the transmit signal generation will improve signal efficiency and accuracy, it would have been obvious to one skilled in the art at the time of invention to incorporate the interference cancellation as disclosed by Fitton into the invention of Hwang.

19. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 200410052236) as applied to claim 27 above, and further in view of Ben-David (U.S. Pub. No. 200410101034).

Claim 33, Hwang fails to disclose the transmit signal generator includes matrix decomposition functionality for decomposing a channel matrix into a unitary matrix and a triangular matrix, however, Ben-David discloses matrix decomposition functionality for decomposing a channel matrix into a unitary matrix and a triangular matrix ([0034]). Decomposing a matrix into triangular and unitary components makes the solving and manipulation of matrix equations much easier. Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the decomposition as disclosed by Ben-David into the invention of Hwang

20. Claims 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (U.S. Pub. No. 2004/0052236) as applied to claim 27 above and further in view of Shany et al. (U.S. Pub. No. 2004/0030979).

Claims 34 Hwang fails to disclose generating a transmit signal includes performing a modulo lattice operation, however, Shany discloses generating a transmit signal includes performing a modulo lattice operation ([0001]). Because modulo lattice operations have computation advantages in the performing of interference canceling, it would have been obvious to one skilled in the art at the time of invention to incorporate the modulo lattice as disclosed by Shany into the invention as disclosed by Hwang.

21. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fitton (U.S.I Pub. No. 2004/0028121) as applied to claim 35 above, and further in view of Ben-David (U.S. Pub. No. 2004/0101034).

Claim 40, Fitton fails to disclose the transmit signal generator includes matrix decomposition functionality for decomposing a channel matrix into a unitary matrix and a triangular matrix, however, Ben-David discloses matrix decomposition functionality for decomposing a channel matrix into a unitary matrix and a triangular matrix ([0034]). Decomposing a matrix into triangular and unitary components makes the solving and manipulation of matrix equations much easier. Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the decomposition as disclosed by Ben-David into the invention of Fitton.

Allowable Subject Matter

22. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf DSouza whose telephone number is 571-272-

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1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Adolf DSouza
Examiner
Art Unit 2611

AD

/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611

